

# **Evaluation of a Modified Physical Conditioning Program for Female Marine Corps Recruit Training**



**Daniel W. Trone, M.A., Scott Flinn\*, CDR, MC, USN, Kelli A. Betsinger\*, B.A., Heidi Kraft, LT, MSC, USNR, David H. Ryman, B.S., & Richard A. Shaffer, CDR, MSC, USN**

**Operational Readiness Research Program,  
Naval Health Research Center, San Diego,  
CA**

**\*Branch Medical Clinic, Marine Corps  
Recruit Depot, Parris Island, SC**

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**Daniel W. Trone, MA**

**e-mail    [trone@nhrc.navy.mil](mailto:trone@nhrc.navy.mil)**

**[www.nhrc.navy.mil](http://www.nhrc.navy.mil)  
NHRC San  
Diego**

# **Modified Physical Fitness Conditioning Program for Female Marine Corps Recruit Training**



**Timothy L. Bockelman, KT, CSCS  
Physical Fitness Advisor,  
Kinesiologist**

**MCRD Parris Island  
Support Battalion Headquarters  
Company**

**[bockelmantl@mcrdpi.usmc.mil](mailto:bockelmantl@mcrdpi.usmc.mil)**

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# **Physical Fitness Conditioning Program Modifications**

- **Include running mechanics training by adding 110 meter striders at the start and finish of PT sessions.**
  - **Stride the straightway, walk the curves**
  - **Four beginning (after Daily-16 warm up) and four at the end (before Daily-16 cool down) of PT session**
- **Decreased other running distances to minimize total mileage increase due to addition of striders.**
  - **2.75 miles total mileage increase**

# **Physical Fitness Conditioning Program Modifications, Cont.**

- **Eliminated formation runs**
  - Replaced with individual effort, squad, and Indian runs
  - Kept the TD54 platoon and the TD63 Graduation formation runs
- **Eliminated running on pavement**
  - Developed an extended dirt track
  - All non-evaluated runs were on dirt track

# **Mid-Test RTR Depot-Wide Changes (Effective 02 August 1999)**

- **Allow recruits to be accustomed to wearing boots**
  - **Alternate boots and running shoes during the first four weeks of training.**
- **Eliminate running on pavement**
  - **All training runs will be done on a dirt track surface.**

# **Study Implementation Summary**

- **Series 4028: no test protocols, dirt track running started during sixth week of training.**
- **Series 4030: Test protocols.**
- **Series 4032: Alternate running shoes and boots for two weeks plus test protocols.**
- **Series 4034: Alternate running shoes and boots for first four weeks plus test protocols.**
- **Series 4036 and 4038: Alternate running shoes and boots for first four weeks plus running on dirt track, rescind remaining Test Protocols.**

# Evaluation of a Modified Physical Fitness Conditioning Program for Female Marine Corps Recruit

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## Training Abstract

- Physical training recommendations to the female Marine Corps recruits' program of instruction (POI).
- The prevention strategy was implemented in 1995. The study population for the 1995-1996 studies (N=2,962) as well as the 1999 study (N=822) included Marine Corps recruits attached to the 4th Recruit Training Battalion at Parris Island. Only female recruits are assigned to the 4th Battalion, so men were not enrolled in these studies.
- Recruits were followed through training for injuries, initial strength test (IST) and physical fitness test (PFT) measurements, Crucible Event success, and graduation success.

# Learning Objectives

- 1. Quantification of acute and overuse injury rates for the entire population (Series 4028 through 4040) and by Group.
- 2. Attempt to answer the question:
  - Did the physical training recommendations to the female Marine Corps recruits' program of instruction (POI) made by the 4th Battalion Commanding Officer and the Support Training Battalion Physical Fitness Advisor, reduce the number of stress fractures and the overall musculoskeletal injury rate while maintaining high-intensity physical activity?

# The Entire Population Characteristics and IST Run

Variable	N=822
• Graduated on-schedule	648 (78.8%)
• Graduated	728 (88.6%)
• Separated	94 (11.4%)
• Age (yr)	18.4 (SD 1.5)
• Height (in)	64.3 (2.5)
• Weight (lbs)	125.6 (14.7)
• BMI (kg/m <sup>2</sup> )	21.5 (2.0)
• IST Run Time 1.5-mile	
	13:28 (1:15)
	pace/mi 8:58

# The Entire Population Injuries

<b>Injury category</b>	<b>N = 822</b>
• All Injuries	488 (59.4%)
• Acute	231 (28.1%)
• Overuse	389 (47.3%)
• Stress fracture	56 (6.8%)
• Pelvic / Femoral stress fracture	16 (1.9%)
• Blisters	105 (12.8%)
• Tend/Burs Ankle/Foot	102 (12.4%)
• Ankle sprain/strain	99 (12.0%)
• Tend/Burs Knee/Lower Leg	74 (9.0%)
• Hip sprain/strain	53 (6.5%)
• Shoulder/Upper Arm	48 (5.8%)
• Back sprain/strain	29 (3.5%)
• Knee sprain/strain	17 (2.2%)
• Tend/Burs Hip/Pelvis/Thigh	14 (1.7%)
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# Data Analyses by Group

- **Total number of recruits shipped between June and September 1999 was 891**
- **Total number of recruits enrolled in the study was 822.**
- **Group 1 Platoons 4028-4029 n=128**
  - "Control Group"
- **Group 2 Platoons 4030-4031 n=122**
  - 4th Battalion physical training changes, equipment changes including running shoes and braziers.
- **Group 3 Platoons 4032-4041 n=572**
  - 4032-4035 Depot wide changes like alternating running shoes and boots. n=238
  - 4036-4041 Depot wide changes stay in effect, rescind 4th Battalion physical training changes. n=334

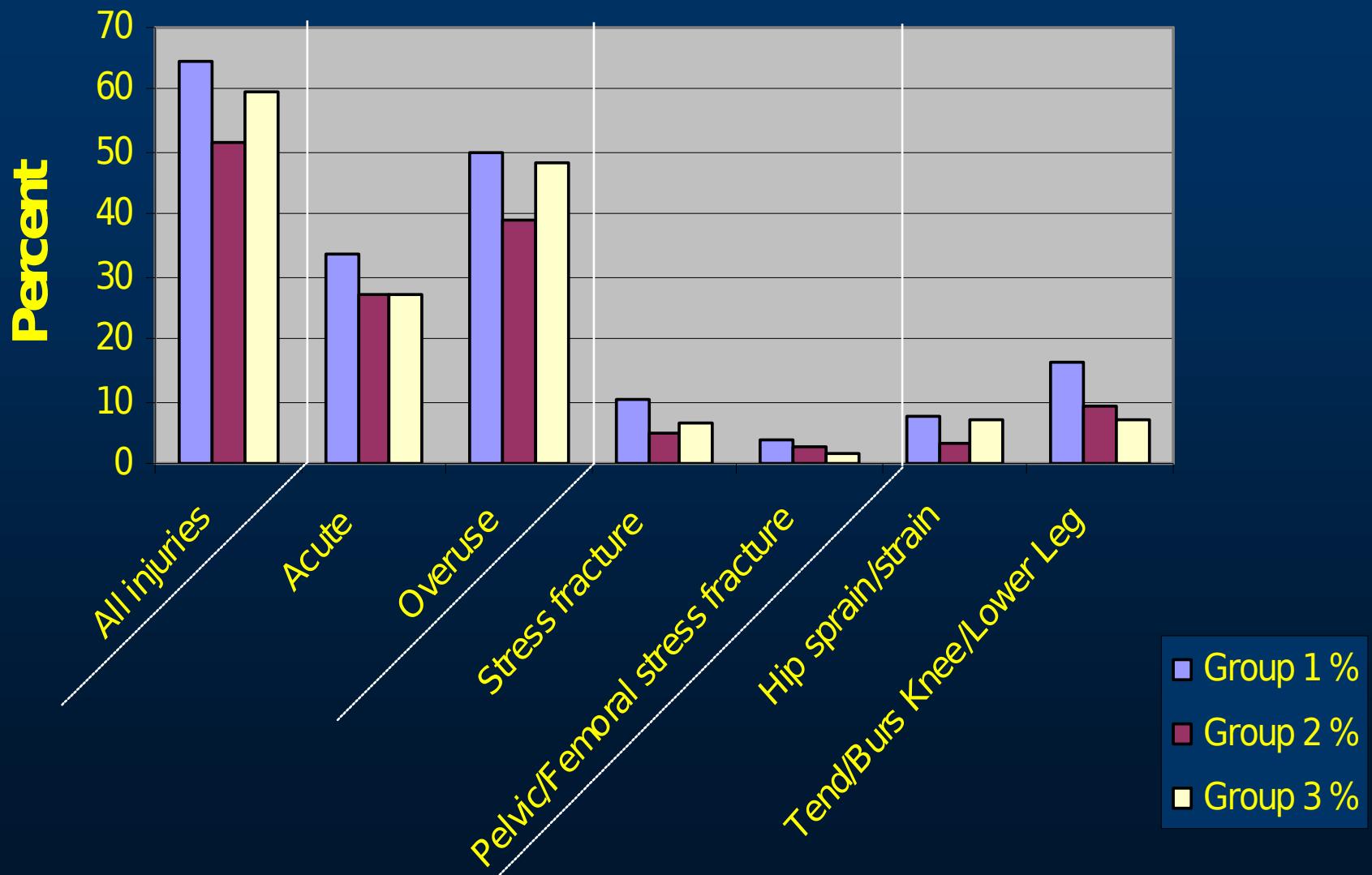
# Injuries by Group

<b>Injury category</b>	<b>Group 1</b>	<b>Group 2</b>	<b>Group 3</b>
• All Injuries	<b>83 (64.8%)</b>	<b>63 (51.6%)</b>	<b>342 (59.8%)</b>
• Acute	<b>43 (33.6%)</b>	<b>33 (27.0%)</b>	<b>155 (27.1%)</b>
• Overuse	<b>64 (50.0%)</b>	<b>48 (39.3%)</b>	<b>277 (48.4%)</b>
• Stress fracture	<b>14 (10.4%)</b>	<b>6 (4.9%)</b>	<b>36 (6.3%)</b>
• Pelvic/Femoral stfx	<b>5 (3.9%)</b>	<b>3 (2.5%)</b>	<b>8 (1.4%)</b>
• Hip sprain/strain	<b>10 (7.8%)</b>	<b>4 (3.3%)</b>	<b>39 (6.8%)</b>
• Tend/Burs Knee/Lower Leg		<b>21 (16.4%)</b>	<b>11 (9.0%)</b>
			<b>42 (7.3%)</b>

# Relative Risk

Injury category		Group 1 vs. Group 2 Relative Risk	
		(p-value)	(95% CI)
• All Injuries	0.03	<b>1.26 (1.01,1.56)</b>	
• Acute	0.26	1.24 (0.85,1.82)	
• Overuse	0.09	<b>1.27 (0.96,1.68)</b>	
• Stress fracture	<b>0.08</b>	<b>2.22 (0.88,5.60)</b>	
• Pelvic/Femoral Stress fracture		0.52	1.59 (0.39,6.50)
<hr/>			
• Hip sprain/strain	0.12	<b>2.38 (0.77,7.40)</b>	
• Tend/Burs Knee/Lower Leg	<b>0.08</b>	<b>1.82 (0.92,3.61)</b>	

# Injuries by Group



# Physical Fitness Test Run Times

Group	Run Time Mean (SD), Range	p=value
<b>IST 1.5-mi Run</b>		
All Recruits n = 813	<b>13:28 (1:15), 9:10 - 17:42</b>	X
• 1 n = 127 p=0.02	<b>13:05 (1:22), 9:10 - 16:20</b>	<b>1 vs. 2</b>
• 2 n = 122 NS	<b>13:29 (1:17), 9:54 - 16:40</b>	<b>2 vs. 3 p=0.80</b>
• 3 n = 564	<b>13:31 (1:26), 9:32 - 17:42</b>	<b>1 vs. 3 p=0.002</b>
<b>PFT 3.0-mi Run</b>		
All Recruits N = 822	<b>26:14 (2:23), 19:20 - 37:19</b>	X
• 1 n = 128	<b>27:50 (2:45), 19:20 - 33:08</b>	<b>1 vs. 2 p=0.001</b>
• 2 n = 122 p=0.001	<b>26:43 (2:30), 20:00 - 32:14</b>	<b>2 vs. 3</b>
• 3 n = 572	<b>25:24 (2:16), 19:50 - 37:19</b>	<b>1 vs. 3 p=0.001</b>

# Stress Fracture Outcome

- **Stress Fracture**

<b>n=56</b>	<b>Graduated</b>	<b>32 (57.1%)</b>	<b>Separated</b>
<b>24 (42.9%)</b>			

- **Pelvic or Femoral Stress Fracture**

<b>n=16</b>	<b>Graduated</b>	<b>10 (62.5%)</b>	<b>Separated</b>
<b>(37.5%)</b>			<b>6</b>

- **Compared to the Total Population**

<b>N=822</b>	<b>Graduated</b>	<b>728 (88.6%)</b>	<b>Separated</b>
<b>94 (11.4%)</b>			

# Injuries by Training Day

**Training Days presented in Four Week  
Intervals**

<b>Training Day Injured Recruit</b>	<b>Injuries</b>	<b>Recruits Injured</b>	<b>per</b>
<b>TD 0 to TD 23</b>	<b>573</b>	<b>302</b>	<b>1.9</b>
<b>TD 24 to TD 47</b>	<b>454</b>	<b>276</b>	<b>1.6</b>
<b>TW 1 to TD 64</b>	<b>395</b>	<b>240</b>	<b>1.6</b>
<b>Total</b>	<b>1422</b>	<b>488</b>	<b>2.9</b>

# Crucible Event TD57 to TD64

	Injuries Reported	Recruits Injured	Outcome
All Injuries	166	119	<b>116 Grad</b> 2 Grad Hold 1 Separated
Acute & Overuse Inj	112	81	
Acute Injuries	44		
Overuse Injuries	68		
Stress Fracture	10	9	<b>4 Grad</b> 6 Grad Hold 0 Separated
Pelvic or Femoral	4	4	<b>4 Grad Hold</b>
Stress Fracture			<b>0 Separated</b>

# Crucible Event TD57 to TD64

Recruits Injured	Injuries Reported
• Blisters, Ankle/Foot/Toes	48
• Ankle Sprain	16
• Hip Flexor Strain	10
• Tendonitis, Ankle/Foot	8
• Hip/Pelvis/Groin Pain	7
• Shin Splints	6
• Patellofemoral Syndrome	6
• Iliotibial Band Syndrome	5
• Fracture (2nd/3rd metatarsal)	4

# Conclusions

**The physical training recommendations to the female Marine Corps recruits' program of instruction, made by the 4th Battalion Commanding Officer and the Support Battalion Physical Fitness Advisor, significantly reduced the number of stress fractures and the overall injury rate while maintaining high-intensity physical activity.**

# Cost Analyses

- Does not include:

- medical separation pay
- facilities fees
- direct nor indirect personnel costs

- Does include:

- **1999 salary and chow cost**

**E-1 < 4 mo. \$909.00/mo.  
\$30.30/day**

**E-1 > 4 mo. \$982.50/mo.  
\$32.75/day**

**E-2 Graduates      \$1,101.60/mo.  
\$36.72/day**

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# Cost Analyses by Series

Series	Grad on schedule	Grad
<b>Separated</b>		
<b>4028-4029</b>	<b>100 (78.1%)</b>	<b>109 (85.2%)</b>
<b>19</b>		
<b>n=128</b>		
<b>4030-4031</b>	<b>96 (78.7%)</b>	<b>112 (91.8%)</b>
<b>10</b>		
<b>n=122</b>		
<b>Total 196 (78.4%)</b>	<b>221 (88.4%)</b>	<b>29</b>
<b>n=250</b>		

# Other Cost Metrics

<b>Series</b> <b>Chow</b>	<b>Total PI Days</b>	<b>Recruit Salary and</b>
4028-4029	12,145	\$471,040.24
n=128 Grad	111 per Grad	\$4,321.47 per
4030-4031	11,471	\$443,854.06
n=122	102 per Grad	\$3,962.98 per Grad
Total	23,616	\$914,894.30
n=250	107 per Grad	\$4,139.79 per Grad

# PCP      MRP

**Series** → **4028-4029**      **4030-4031**

**PCP recruit**      5      2

**PCP days**      126      28

**days per recruit**      25      14

**MRP recruit**      12      8

**MRP days**      654      465

**days per recruit**      55      58

**MRP w/stfx**      9      3

**MRP w/stfx days**      568      246

**days per recruit**      63      82

# BMP      Grad Hold

<b>Series</b> →	<b>4028-4029</b>	<b>4030-4031</b>
<b>BMP recruit</b>	8	4
<b>days</b>	384	224
<b>days per</b>	48	56
<b>total cost</b>	\$17,249.28	\$10,062.08
<b>cost per recruit</b>	\$2,156.16	\$2,515.52
<b>BMP recruit w/stfx</b>	4	3
<b>days</b>	267	205
<b>days per</b>	67	68
<b>total cost</b>	\$11,993.64	\$9,208.60
<b>cost per recruit</b>	\$2,998.41	\$3,069.53

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